

CLAIMS

What is claimed is:

1. A method of forming a dielectric chamber in the vicinity of a
5 semiconductor device area, the method comprising:
forming a dummy structure over a semiconductor substrate;
depositing a dielectric layer over the dummy structure;
forming an opening through the dielectric layer to the dummy
structure; and
10 removing the dummy structure to form the dielectric chamber.
2. The method of claim 1, further comprising filling the dielectric
chamber with a gas.
- 15 3. The method of claim 2, wherein the gas comprises air.
4. The method of claim 2, wherein the gas comprises an inert gas.
5. The method of claim 1, wherein forming the dummy structure
20 comprises forming the dummy structure using a polysilicon material.
6. The method of claim 1, wherein removing the dummy structure
comprises using a downstream plasma etching process.

7. The method of claim 1, further comprising depositing a dielectric layer over the semiconductor substrate before forming the dummy structure.
- 5 8. The method of claim 1, further comprising depositing an oxide layer over the dummy structure.
9. The method of claim 8, wherein the hole extends through the oxide layer to the dummy structure.
- 10 10. The method of claim 8, further comprising forming a metal liner over the oxide layer.
11. The method of claim 1, further comprising depositing a metal layer over the dummy structure.
- 15 12. The method of claim 11, further comprising polishing the metal layer.
13. The method of claim 1, further comprising depositing an insulating material over the dielectric layer.
- 20 14. The method of claim 13, further comprising depositing another dielectric layer over the insulating material.

15. The method of claim 14, wherein the hole is formed through the another dielectric layer, the insulating layer, and the dielectric layer.
- 5 16. The method of claim 1, further comprising:
depositing a metal layer over the dummy structure;
polishing the metal layer;
depositing an insulating material over the metal layer; and
forming a contact stud through the insulating layer and the dielectric
10 layer so that the contact stud contacts the metal layer.
17. The method of claim 1, wherein said dielectric chamber is formed in one of the active layer, the passive layer, and the first metal layer.
- 15 18. The method of claim 1, wherein the dummy structure is formed in multiple levels among conductive lines.
19. The method of claim 18, wherein the conductive lines comprise a first set of conductive lines at a first level and a second set of conductive lines at a
20 second level over the first level.
20. The method of claim 19, wherein the second set of conductive lines cross the first set of conductive lines.

21. A method of forming a dielectric chamber in the vicinity of a semiconductor device area, the method comprising:

- forming a plurality of dummy structures over a semiconductor
5 substrate;
- depositing a dielectric layer over the dummy structures;
- forming an opening through the dielectric layer to a selected one of the plurality of dummy structures; and
- removing the selected dummy structure to form the dielectric chamber.

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22. A method of forming a dielectric chamber in the vicinity of a semiconductor device area, the method comprising:

- forming a plurality of gate structures over a semiconductor substrate;
- forming a plurality of dummy structures between the plurality of gate
15 structures;
- depositing a dielectric layer over the plurality of dummy structures;
- forming an opening through the dielectric layer to predetermined dummy structures; and
- removing the predetermined dummy structures to form the dielectric
20 chamber.

23. The method of claim 22, further comprising forming another dielectric film on the plurality of gate structures.

24. The method of claim 22, further comprising patterning the dielectric layer.
- 5 25. The method of claim 24, further comprising depositing another dielectric layer over the dielectric layer.
26. The method of claim 22, further comprising depositing an insulating material over the dielectric layer before forming the opening and wherein the forming of the opening comprises forming the opening through the insulating layer.
- 10 27. An electronic device comprising:
a semiconductor substrate;
15 a plurality of conducting lines on the semiconductor substrate;
a dielectric chamber between two of the plurality of conducting lines;
and
a structure between another two of the plurality of conducting lines.
- 20 28. The device of claim 27, wherein the dielectric chamber is filled with a gas.
29. The device of claim 28, wherein the gas comprises air.

30. The device of claim 28, wherein the gas comprises an inert gas.
31. The device of claim 27, further comprising a dielectric layer over the
5 dielectric chamber.
32. The device of claim 31, wherein the dielectric layer defines an opening
over the dielectric chamber.
- 10 33. The device of claim 27, wherein the plurality of conducting lines
comprise a plurality of metal lines.
34. The device of claim 27, wherein the plurality of conducting lines
comprise a plurality of polysilicon gate structures.
- 15 35. The device of claim 27, wherein said dielectric chamber is formed in
one of the active layer, the passive layer, and the first metal layer.
36. An electronic device comprising:
20 a semiconductor substrate;
a first set of conducting lines over the semiconductor substrate;
a second set of conducting lines over the first set of conducting lines;
and

a dielectric chamber between the first set of conducting lines and the second set of conducting lines.

37. The device of claim 36, further comprising another dielectric chamber
5 between one of two conducting lines in the first set of conducting lines and two conducting lines in the second set of conducting lines.

38. The device of claim 36, further comprising another dielectric chamber
between said first set of conducting lines and said semiconductor substrate.
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39. The device of claim 36, wherein the second set of conductive lines cross the first set of conductive lines.

40. A semiconductor structure, comprising:
15 a semiconductor substrate;
a plurality of conducting lines on the semiconductor substrate;
a dielectric chamber between two of the plurality of conducting lines;
and
a structure between another two of the plurality of conducting lines.

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41. The device of claim 40, wherein the dielectric chamber is filled with a gas.

42. The device of claim 41, wherein the gas comprises air.
43. The device of claim 41, wherein the gas comprises an inert gas.
- 5 44. The device of claim 40, further comprising a dielectric layer over the dielectric chamber.
45. The device of claim 44, wherein the dielectric layer defines an opening over the dielectric chamber.
- 10 46. The device of claim 40, wherein the plurality of conducting lines comprise a plurality of metal lines.
47. The device of claim 40, wherein the plurality of conducting lines
- 15 48. The device of claim 40, wherein said dielectric chamber is formed in one of the active layer, the passive layer, and the first metal layer.